# JOURNAL

OF THE

# Elisha Mitchell Scientific Society

(Official Publication of the N. C. Academy of Science)

ISSUED QUARTERLY

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VOL. XX

1904

WITH ONE PLATE AND TWENTY-SIX FIGURES IN THE TEXT

CHAPEL HILL, N. C.
PUBLISHED BY THE UNIVERSITY

# Elisha Mitchell Scientific Society.

WM. CAIN, President.

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A. S. WHEELER, Rec. Sec. F. P. VENABLE, Cor. Sec.

EDITORS OF THE JOURNAL:

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J. E. LATTA, ARCHIBALD HENDERSON.

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## CONTENTS.

PROCEEDINGS N. C. ACADEMY OF SCIENCE. First Meeting..... 2
PROCEEDINGS N. C. ACADEMY OF SCIENCE. Second Meeting..... 7
CONSTITUTION AND BY-LAWS OF THE ACADEMY..... 17
LIST OF MEMBERS OF THE ACADEMY..... 19
APPROACHING SUNSPOT MAXIMUM.—*J. F. Lanneau*..... 21
BOX TORTOISES OF SOUTHEASTERN NORTH AMERICA.—*C. S. Brimley*..... 27
CHAPEL HILL LIVERWORTS.—*W. C. Coker*..... 35
RECENTLY DISCOVERED MINERAL LOCALITIES IN NORTH CAROLINA.—*Collier Cobb*..... 38
INORGANIC CHEMISTRY AND THE PHASE RULE.—*Wilder D. Bancroft*..... 39
EAST AMERICAN THORNS.—*W. W. Ashe*..... 47
INACTIVE THORIUM.—*Fritz Zerban*..... 57
PROCEEDINGS N. C. ACADEMY OF SCIENCE..... 65
SCIENCE AND THE PEOPLE.—*Charles Baskerville*..... 68
MOLECULAR ATTRACTION.—*J. E. Mills*..... 80
PROCEEDINGS N. C. ACADEMY OF SCIENCE..... 115
ON THE GRAPHIC REPRESENTATION OF THE PROJECTION OF TWO TRIADS OF PLANES INTO THE MYSTIC HEXAGRAM.—*A. Henderson* 124
WORKING UP ENTOMOLOGICAL FAUNA OF N. C.—*Franklin Sherman, Jr., and C. S. Brimley*..... 134
A CASE OF SNAKE-BITE.—*C. S. Brimley* ..... 137
FURTHER NOTES ON THE REPRODUCTION OF REPTILES.—*C. S. Brimley*.. 139
SOME INTERESTING INSECT CAPTURES.—*Franklin Sherman, Jr*..... 141
MOLECULAR ATTRACTION.—*J. E. Mills*..... 145

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PUBLISHED BY THE UNIVERSITY OF NORTH CAROLINA
1904

THE UNIVERSITY PRESS
CHAPEL HILL

JOURNAL

OF THE

ELISHA MITCHELL SCIENTIFIC SOCIETY

TWENTIETH YEAR

1904

## PROCEEDINGS OF THE NORTH CAROLINA ACADEMY OF SCIENCE.

The first annual meeting of the North Carolina Academy of Science was held at Trinity College, Durham, Nov. 28 and 29, 1902.

A business session was called to order on the morning of the 28th in the physics lecture room. The executive committee made its report and announced the election of twenty-three members.

On motion the executive committee was authorized to publish the proceedings of this meeting, including the constitution and by-laws.

The following amendment to the consritution was proposed, to be acted on at the next annual meeting: To insert after Section 2, Article II.:

"SECTION 3. Any individual who shall contribute one hundred dollars to the maintenance of the Academy may be elected a patron of the Academy."

After the busidess session the presentation of papers was taken up and continued through the afternoon session.

In the evening an address of welcome was delivered by Judge R. W. Winston of Durham; Professor Collier Cobb responding for the Academy. The retiring president, Professor W. L. Poteat, then delivered his address; subject, "*Science and Life.*" This was followed by a reception to the

members of the Academy by the ladies and faculty of Trinity College.

Another business session was held on the morning of the 29th. On recommendation of the nominating committee, consisting of Professor Collier Cobb, Mr. C. S. Brimley and Professor W. B. Sackett, the following officers were elected:

President, C. W. Edwards.

Vice-President, C E. Brewer.

Secretary-Treasurer, Franklin Sherman, Jr.

Executive Committee, C. W. Edwards and Franklin Sherman, Jr., ex-officio, F. L. Stevens, W. G. Sackett, H. H. Brimley, C. B. Williams, W. L. Poteat, Chas. Baskerville, Collier Cobb.

The following by-law was adopted:

*The executive committee shall fill all vacancies occurring between meetings of the Academy.*

It was resolved that the Academy extend its heartfelt thanks to the faculty of Trinity College and to the local committee in particular for the kindness shown in arranging so admirably for this meeting.

On the conclusion of business, the presentation of papers was again taken up and continued until the final adjournment at the close of the session.

The program of papers presented at this meeting is as follows:

PAPERS READ.

1. A New Method of Investigating Alternating Current Phenomena. *C. W. Edwards.*
2. Some Recent Work on the Morphology of the Coral Polyps. *J. E. Duerden.*
3. Baccillary Dysentery. *Fred K. Cooke.*
4. Some Interesting Insect Captures. *Franklin Sherman, Jr.*
5. Notes on the Reproduction of Certain Reptiles. *C. S. Brimley.*
6. Ecological Notes on Mosquitoes with Notes on Color Preference. *W. G. Sackett.*

7. Primary Nucleus in Synchytrium. *Mrs. F. L. Steveus.*

8. Changes in the North Carolina Coast During Two Decades, with Notes on the Origin of the Sand-hill Topography of the Coastal Plain. *Collier Cobb.*

9. Predecessors of Roentgen and Becquerel. *Jas. L. Lake.*

10. Distribution of Some Birds in Eastern North Carolina. *T. Gilbert Pearson.*

11. Some Considerations of Rare Earths. *Chas. Baskerville.*

12. Additional North Carolina Desmids (brief). *W. L. Poteat.*

13. Some Plant Formations South-east of Raleigh (brief). *W. G. Sackett.*

14. Notes on North Carolina Plants (brief). *F. L. Stevens.*

The following papers were read by title:

Certain Compounds in the Husk of *Juglans nigra*. *C. E. Brewer.*

Prairies in North Carolina. *W. W. Ashe.*

Diurnal Nutation in *Bidens frondosa*. *F. L. Stevens.*

The Animal Tuberculoses and Their Relation to Human Tuberculoses. *Tait Butler.*

The Pollen of the Gymnosperms. *W. C. Coker.*

List of the Dragon-flies of Raleigh. *C. S. Brimley.*

Notes on Food-habits of Reptiles in Confinement. *C. S. Brimley.*

A Simple Device for Illustrating the Periodic Law to Students. *Chas. Baskerville.*

Improvement in Determination of Halogens in Atomic Weight Work. *Chas. Baskerville.*

Notes on Some North Carolina Algae and Fungi. *W. C. Coker.*

FRANKLIN SHERMAN, JR.,
*Secretary.*

## BUSINESS MEETING.

A business meeting of the North Carolina Academy of Science was held in the office of Tait Butler, State Veterina-

rian, Raleigh, N. C., on May 1, 1903, at 5:30 P. M., President Edwards in the chair.

Dr. Baskerville reported that the Journal of the Elisha Mitchell Society, published at the State University, might be enlarged to meet the demands of the Academy publications, if the Academy could bear approximately two-thirds of the necessary increase, which was estimated roughly at one hundred dollars.

The following amendments, as recommended by the Executive committee in their meeting at Durham, Feb. 23, 1903, somewhat revised, were adopted:

AMENDMENTS—ARTICLE II.

SECTION 1. Any person actively interested in science, or in the promotion of science, may, upon nomination by two members, be elected a member of the Academy by a majority vote of the executive committee and shall be entitled to all privileges of the Academy.

Relatives of members or others interested in Science may become associates for the annual meeting upon payment of a fee of one dollar. Associates receive the proceedings and are entitled to all privileges of that meeting except voting and holding office.

SEC. 2. The annual dues for members shall be three dollars and for associates one dollar, and any person in arrears at the date of the annual meeting for the presentation of papers forfeits all privileges of the Academy until the dues are paid.

The following by-law was also adopted:

BY-LAW 2.

All elections to membership which take place subsequent to the annual meeting for presentation of paper shall apply to the following calendar year, and no regular dues are to be collected for the year of such election. All elections to membership which take place at or before the annual meeting for the presentation of papers shall apply to the calendar year in which the election takes place, and dues shall be collected

accordingly, and dues regularly become payable on January 1 of each year.

The following amendment was proposcd, to be acted upon at the next regular meeting:

To amend Article III., Section 1 to read: "and an executive committee of five, etc."

On motion the following committee was appointed to attend to the matter of publication: C. W. Edwards, W. L. Poteat, C. S. Brimley.

On motion the University of North Carolina was selected for the next annual mecting.

The meeting then adjourned.

FRANKLIN SHERMAN, JR.,
*Secretary.*

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## SECOND ANNUAL MEETING.

The second annual meeting of the North Carolina Academy of Scienee was held at the University of North Carolina, Chapel Hill, Nov. 12 and 13, 1903.

The opening session was held in Gerrard Hall on the evening of the 12th. An address of welcome by Dr. F. P. Venable, president of the University, was followed by the annual address of the retiring president, Professor C. W. Edwards, of Trinity College, whose subject was "Science and the State."

On adjournment a smoker was given in the Alumni building to the members of the Academy by the Elisha Mitchell Scientific Society.

On the morning of the 13th a business meeting was held in the Physics lecture room of the Alumni building. In the absence of the secretary, Mr. J. E. Latta, instructor in Physics in the University, was made temporary secretary.

The following amendments to the constitution were adopted:

(1) That the executive committee shall consist of five instead of nine members.

(2) That any individual who shall contribute one hundred dollars to the maintenance of the Academy may be elected a patron of the Academy.

On the recommendation of the nominating committee, consisting of Prof. W. L. Poteat, Prof. Collier Cobb and Mr. C. S. Brimley, the following officers were elected:

President, Chas. Baskerville.

Vice-President, J. I. Hamaker.

Secretary-Treasurer, Franklin Sherman, Jr.

Executive Committee, Chas. Baskerville and Franklin Sherman, Jr., ex-officio, and W. L. Poteat, F. L. Stevens and C. S. Brimley.

Sixteen new members were elected.

The presentation of papers was now taken up for the remainder of the morning session and continued through the afternoon session.

The following papers were presented:

Approaching Sun-Spot Maximum. *Jno. F. Lanneau, Wake Forest.* (Published in full in this Journal).

Notes on Some Pacific Sponges. *H. V. Wilson, Chapel Hill.*

Southeastern Box Tortoises. *C. S. Brimley, Raleigh.* (Abstract).

The six species of Terrapene are enumerated and their alleged characters given with observations on specimens of Terrapene from Raleigh, N. C., several points in Florida, Mimsville, Ga., and Colmesneil, Texas, showing that these characters are frequently not diagnostic. The author is convinced that Terrapene ornata, T. major and T. carolina are distinct species, and he is inclined to believe that T. bauri is at least subspecifically distinct from T. major, and that T. triungis is a southern form of T. carolina and not a distinct species; however he is by no means certain in either case and furthermore he is not even certain that the triungis from Georgia are specifically identical with those from Texas. Number of specimens examined 57 in all.

*Terrapene triungis* Mimsville, Ga. 20 living; 7 alcoholic;

Bay St. Louis, Miss., 1 alcoholic; Colmesneil, Tex., 3 alcoholic, 1 living, 1 shell; *Terrapene Carolina*, Raleigh, N. C., 7 alcoholic and numerous living examples; *Terrapene Major*, Tallahassee, Fla., 2 alcoholic; Riceboro, Ga., 1 alcoholic; *Terrapene Bauri*, Orlando, Fla., 4 living and 1 alcoholic; Hastings, Fla., 7 alcoholic and 1 live specimen; Mimsville, Ga., 1 alcoholic.

Poisining by Lepiota Morgani pk. *F. L. Stevens, West Raleigh.* Read by W. C. Coker. (Abstract).

Account is given of a personal experience with this fungus, leaving no doubt that on some persons at least it produces an extremely active toxic effect. The article will appear in the Journal of Mycology.

Chapel Hill Liverworts. *W. C. Coker, Chapel Hill.*

This paper appears in full in next issue of this Journal.

Notes on the Transformation of Some Large Moths. *C. S. Brimley, Raleigh.*

A Simple Device for Illustrating the Periodic Law. *Chas. Baskerville, Chapel Hill.* (Will be published in School Science).

Action of Ultra-Violet Light upon Rare Earth Oxides. *Chas. Baskerville.* (American Journal of Science, Dec. 1903.)

The Effects on Rare Earth Oxides of Radium-barium Compounds, and on the Production of Permanently Luminous Compounds by Mixing the latter with Powdered Minerals. *Chas. Baskerville* and *Geo. F. Kunz.* (Will appear in the Am. J. Sci., Jan. 1904).

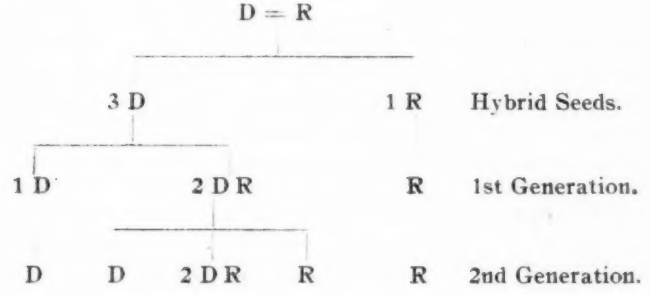
Demonstration of the Parasite in Anchylostomiasis (Hookworm Disease). *W. S. Rankin, Wake Forest.*

Mendel's Contribution to a Theory of Heredity. *W. L. Poteat, Wake Forest.* (Abstract).

Gregor Johann Mendel (1822–1884) published in 1866 in an obscure Austrian Journal a paper describing "Experiments in Plant Hybridization." Professor Hugo de Vries, of Amsterdam, who had taken up a similar line of work, brought the paper out of its long hiding in 1900. Its importance was at once apparent. The task which Mendel set himself was, to

determine how many forms of offspring hybrids would produce, to arrange these forms according to their separate generations, and to ascertain their statistical relations to each other. He found that the genus *Pisum* fulfilled the conditions essential in the experimental plants. In the work which extended over eight years the pea hybrids were found to be not intermediate between the parental forms as regards the two differentiating characters which were crossed, but one of these characters was transmitted unchanged—the "dominant" character of the pair, and the other seemed hardly to be transmitted at all—the "recessive" character. When a plant having a particular dominant character, as round, smootish seeds, was crossed with one having a corresponding character, namely, angular and deeply wrinkled seeds, the resulting hybrid's seeds were all of them either round and smootish or angular and wrinkled in the proportion of three to one respectively. The next generation from the angular seeds—bred true; from the round seeds (dominant), produced all round seeds, which, however, subsequent generations showed to be of two kinds—pure dominants breeding true, and hybrids (twice as many as the dominants) yielding precisely the same results as were observed in the first generation of the hybrid.

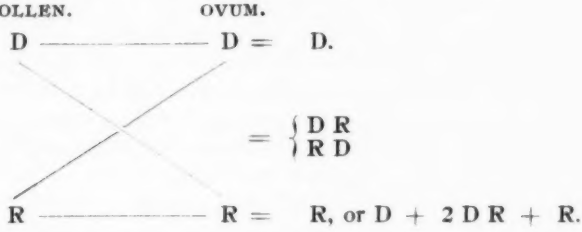
The results may be exhibited graphically in the following scheme, where D stands for a dominant character and R for a recessive:



By substituting values the formula is deduced covering the kinds of hybrid offspring in their numerical relation for a series of generations:

$$D + 2\,D\,R + R.$$

This experimental result accords with what the law of probabilities would lead one to expect in the average of unions of the pollen and egg cells of the two parental forms. On the average D pollen will fertilize equally often D ova and R ova, and R pollen will fertilize equally often D ova and R ova. The chances and the results may be exhibited thus:




Mendel appears to have demonstrated that in the offspring of a hybrid 25 per cent. will show the recessive character and 75 per cent. the dominant, embracing 25 per cent. pure dominants and 50 per cent. hybrids. Accordingly his contribution to a theory of heredity may be stated to be the demonstration of the segregation of characters in the totality of an organism and the individuality of characters, which is preserved down the line of descent.

A New Palaeotrochis Locality, with Some Notes on the Nature of Palaeotrochis. *Collier Cobb, Chapel Hill.* (Illustrated by specimens and microphotographs, with the microscopic sections displayed under a microscope).

An acid volcanic rock full of spherulites closely resembling Palaeotrochis occurs on the elevation three miles west of Chapel Hill known as The Old Volcano. These spherulites are smaller than Palaeotrochis, but they and the rock in which

they occur have the same general character as the specimens from the Sam Christian Mine. These from Chapel Hill are smaller and the definite Palaeotrochis form not so abundant among them. Microscopical study shows that they are composed of quartz, fibrous feldspar, and mica (usually green biotite), just the minerals common in the igneous rocks around Chapel Hill. These studies indicate the inorganic origin of Palaeotrochis.

Secondary Radiation from Thorium Compounds. *Geo. B. Pegram, New York.*

The following papers were read by title:

The Flora of the Isle of Palms, South Carolina. *W. C. Coker, Chapel Hill.* (Abstract).

The flora of this island, which is near Charleston, is semi-tropical in character and presents an interesting transition between that of the Florida and North Carolina coasts. The island is entirely formed of wind-blown sand and its seaward side is furnished with high dunes which offer good advantages for the study of the binding action of grasses and the dune plants.

Twenty-seven species of grasses were found, five of which also occur in the Bahama Islands.

Thirteen species of trees and twenty-five of woody vines occur; the most abundant trees being the Palmetto (Sabal Palmetto), Live Oak (Quercus virens), Laural Oak (Quercus Jaurifolia) and the Old Field Pine (Pinus taeda). Photographs were taken of various plant associations.

Theory of the Induction Coil. *C. W. Edwards, Durham.*

The Granville Tobacco Wilt. *F. L. Stevens and W. G. Sackett, Raleigh.* (Abstract).

A new tobacco disease which is exceedingly destructive is recorded for Granville County. The disease is described, the extent of the damage estimated, and its history and distribution given.

The diseased plants in the effected parts of the root and

stem contain numerous bacteria, which probably cause the disease, though definite proof of this point has not yet been had, owing to the absence of tobacco plants in suitable condition for inoculation. The substance of this paper was issued in September as bulletin No. 188 of the North Carolina Experiment Station.

Improvement of Corn by Seed Selection. *C. B. Williams, Raleigh.* (Abstract).

For the improvement of corn there are three methods in general practice: first, by the importation of seed from some reputable grower or breeder; second, by the careful selection of seed corn from one's own field or from a neighbor's; third, by careful selection and growing of seed-corn in a field isolated at least one-quarter of a mile from any other corn field.

The characters that should be taken into account in seed selection are: (1) Selection of ears from stalks that have two or more ears, as it has been demonstrated time and again that two medium sized ears from a stalk give higher yields per acre than one large ear. (2) The stalks should be large at the base and gradually tapering towards the tassel for two reasons: first, because it will be better enabled to withstand drought, and second, because it will stand better in a wind storm. (3) The ears should by all means be of a cylindrical form with both butts and tips filled out, as this is the form that gives the highest percentage yield of shelled corn per ear. The difference in yield, as a result of actual experience of ears of the same length, between those that had the tips filled and those that were not, was something like six bushels per acre. (4) The best shaped kernel is a medium wedge, as this fills the space on the cob most completely. Also the distance between the rows of grains on the cob should be small, while the number of rows should be large, and they should run parallel the full length of the cob, with little or no diminution in size either at the butts or tips.

This paper will appear in full in the Bulletin of the North Carolina Department of Agriculture, Vol. 24, No. 9.

The Forms of Sand-Dunes as Influenced by Neighboring Forests. *Collier Cobb, Chapel Hill.* (Illustrated by photographs).

While the deforesting of the sandreefs is the primary cause of the dunes along the North Carolina coast, there are several instances in which the trees are the obstacles which have produced the dunes. In all these cases "The Banks" run directly across the course of the prevailing winds, which come from the southwest, and just as soon as the vegetation becomes so dense that it prevents this southwest wind from blowing the wave-driven sand back into the sea, a sandwave forms equal in height to the height of the forest. This is best shown in the high dune north of Manteo, on Roanoke Island. It is also noticeable on Currituck Beach, and at several points opposite Masonboro Sound; and forests were influential in forming the dunes at Nag's Head. On the Kinnakeet section of Hatteras Island the dunes were started by the deforesting of a strip next the shore, when they rose to the height of the forest which they finally covered and destroyed. The barren sandwaste there is still known as "The Great Woods." Dunes in many of these cases along our coast might be removed by thinning out the forest and removing the tangle of vines and undergrowth which prevent the west winds from driving the sands back into the sea.

Even where the dunes are formed by the prevailing winds, as between Fort Caswell and Lockwood's Folly and on Shackleford Banks, in every case where the forest growth is dense the encroaching bank of moving sand is at the same height as the tops of the trees. When the trees are sparse and scattered in clumps the moving sands form irregular sandhills instead of great waves.

Work on a List of Insects of North Carolina. *Franklin Sherman, Jr., Raleigh.* (Abstract).

The author is endeavoring to compile a card-catalogue of all species of insects actually known to occur within the State of North Carolina. Three methods are being followed: (1)

securing accurate identification of specimens now being collected; (2) compiling lists of all species from North Carolina found in the larger collections of the country; (3) making lists from all authoritative published literature. The work has only been in progress about one year, and only certain groups have yet been catalogued at all.

Under the first head chief attention has been given to the State collections at Raleigh in charge of the author, and the private collections of Mr. C. S. Brimley at Raleigh, these being the only ones of any extent known to be in the state. Mr. Brimley's work has largely contributed to make the catalogue as complete as it now is. The work of compiling lists from the collections of the country and from the published literature is under way, though being carried on at considerable disadvantage,

Life Histories of Some Southern Birds. *T. G. Pearson, Greensboro.*

List of the Cicindelldae of North Carolina with Notes on the Species. *Franklin Sherman, Jr.* (Abstract).

During the years 1901 and 1902 the author devoted considerable attention to collecting the Tiger beetles of the State. The species where not known positively by the author were identified by competent persons. The list, including species recorded by others as well as those collected by the author, contains nineteen distinct species and three varieties. Of these all save one species and one variety are represented in the collection of the N. C. Department of Agriculture.

The list contains the following:

1 Tetvacha carolina, Linn.
2 " virginica, Linn.
3 Cicindela unipunctata, Fab.
4 " scuttellaris *var.* unicolor, Dej.
4a " " *var.* modesta, Dej.
4b " scuttellaris *var.* rugifrons, Dej.
5 " 6-guttata, Fab.
5a " " *var.* Harrissi, Leng.
6 " patruela, Dej.

7 Cicindela purpurea, Oliv.
8 " splendida, Hentz.
9 " vulgaris, Say.
10 " reponda, Dej.
11 " 12-guttata, Dej.
12 " hirlicollis, Say.
13 " punctulata, Fab.
14 " dorsalis *var.* media, Lec.
15 " marginata, Fab.
16 " blandada, Lec.
17 " gratiosa, Guer.
18 " rufiventris, Dej.
19 " abdominalis, Fab.

To be published in full in "Entomological News."

Observations on the Cytology of the Phycomcetes. *Adeline C. Stephens, West Raleigh.*

Rare North Carolina Birds. *T. G. Pearson, Greensboro.*

After the presentation of papers the following resolution was adopted: "That the North Carolina Academy of Science hereby expresses its heartfelt appreciation of the many courtesies extended to it by the President and faculty of the University, both collectively and individually."

The Academy then adjourned.

At 8 o'clock in the evening a public lecture, complimentary to the Academy, was given by Dr. Baskerville, President of the Elisha Mitchell Scientific Society, in Gerrard Hall. Subject: "Fluorescence, Phosphorescence, Action of Ultra-violet Light, Roentgen Rays, and Radium upon Minerals and Gems." (Illustrated by experiments and stereopticon.)

This was followed by a reception to the members of the Academy by the ladies and faculty of the University in the Zeta Psi Fraternity Hall.

J. E. Latta,
*Temporary Secretary.*

# CONSTITUTION.

## ARTICLE I.

### NAME AND OBJECT.

SECTION 1. The name of this organization shall be the "NORTH CAROLINA ACADEMY OF SCIENCE."

SEC. 2. The objects of the Academy shall be to promote study and scientific research and to furnish, so far as practicable, a means of publication of such articles as may be deemed worthy.

## ARTICLE II.

### MEMBERSHIP AND DUES.

SECTION 1. Any person actively interested in science, or the promotion of science, may, upon nomination by two members, be elected a Member of the Academy by a majority vote of the Executive Committee, and shall be entitled to all privileges of the Academy.

Relatives of members, or others interested in science, may become Associates for the annual meeting, upon the payment of a fee of one dollar. Associates receive the proceedings, and are entitled to all privileges of that meeting except voting and holding office.

SEC. 2. The annual dues for members shall be three dollars, and for Associates one dollar, and any person in arrears at the date of the annual meeting for presentation of papers, forfeits all privileges of the Academy until the dues are paid.

## ARTICLE III.

### OFFICERS.

SECTION 1. The officers of the Academy shall be a President, Vice-President, Secretary-Treasurer, and an Executive Committee of five, including the President and Secretary, of

which three shall constitute a quorum. All officers shall be elected annually, by ballot, by majority vote.

SEC. 2. The duties of all officers shall be such as usually pertain to such positions.

## ARTICLE IV.

### MEETINGS.

SECTION 1. The time and place of all meetings shall be determined by the Executive Committee, but there shall be at least one meeting annually for the presentation and discussion of papers, and at least one business meeting annually.

SEC. 2. Two weeks' notice shall be given of all meetings and those present shall constitute a quorum.

## ARTICLE V.

### PUBLICATIONS.

SECTION 1. The official organ of the Academy shall be known as the "*Journal of the North Carolina Academy of Science*," over which the Executive Committee shall have general control, but the detail work shall be left to an Editorial Committee of three, whom the Executive Committee shall elect.

## ARTICLE VI.

### AMENDMENTS.

SECTION 1. This Constitution may be amended by a two-thirds vote of those present at any regular meeting; *Provided*, That such amendments be submitted in writing to the Executive Committee at least two weeks before the meeting at which action is to be taken.

## BY-LAWS.

1. The Executive Committee shall fill all vacancies occurring between meetings of the Academy.

2. All elections to membership, which take place subse-

quent to the annual meeting for presentation of papers, shall apply to the following calendar year, and no regular dues can be collected for the year of such election. All elections to membership, which take place at or before the annual meeting for the presentation of papers, shall apply to the calendar year in which the election takes place, and dues shall be collected accordingly; and dues regularly become payable on January 1st of each year.

RESOLUTION OF EXECUTIVE COMMITTEE.

*Resolved*, That upon the written request of three or more members, the Secretary shall call a meeting of the Committee to consider such matters as may be laid before it, said meeting to take place within ten days from the time the reqeust is submitted.

## LIST OF MEMBERS.

| | |
|---|---|
| Andrews, W. J., | Raleigh. |
| Ashe, W. W., | " |
| Baskerville, Chas., Univ. N. C., | Chapel Hill. |
| Battle, K. P., | Raleigh. |
| Beardslee, Henry C., | Asheville. |
| Binford, Raymond, Guilford College, | Guilford College. |
| Brewer, C. E., Wake Forest College, | Wake Forest. |
| Brinkley, C. S., | Raleigh. |
| Burkett, Chas. W. A. & M. College. | West Raleigh. |
| Butler, Tait, Dept. Agr., | Raleigh. |
| Cain, W. M., University N. C., | Chapel Hill. |
| Chaplin. Spencer, | Littleton. |
| Cobb, Collier, | Chapel Hill. |
| Coker, R. E., Biological Laboratory., | Beaufort. |
| Coker, W. C., University N. C., | Chapel Hill. |
| Cooke, Fred K., Wake Forest College, | Wake Eorest. |
| Duerden, J. E., University N. C., | Chapel Hill. |
| Edwards, C. W., Trinity College, | Durham. |
| Garrett, Mrs. R. U., | Asheville. |

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|---|---|
| Gore, J. W., University N. C., | Chapel Hill. |
| Hammaker, J. T., Trinity College., | Durham. |
| Haskell, A. A., A. & M. College, | West Raleigh. |
| Henderson, A., University N. C., | Chapel Hill. |
| Hoffman, S. W., | Statesville. |
| Holmes, Jos. A., Geological Survey, | Chapel Hill. |
| Howell, E. V., University N. C., | " " |
| *Kesler, J. L., | Raleigh. |
| Kilgore, B. W. Dept. Agr., | " |
| Lake, Jas. L., Wake Forest College, | Wake Forest. |
| Lanneau, M. A., Wake Forest College, | " " |
| Latta, J. E., University N. C. | Chapel Hill, |
| Lewis, R. H., State Board Health, | Raleigh. |
| Massey, W. F., | " |
| *Meade, Miss A. M., | " |
| Morrison, W. G., A. & M. College, | West Raleigh. |
| Myers, E. W., | Greensboro. |
| Pearson, T. Gilbert, Normal College, | " |
| Pegram, W. H., Trinity College, | Durham. |
| Poteat, W. L., Wake Forest College, | Wake Forest. |
| Rankin, W. S., " " " | " " |
| Roberts, G. A., Dept. Agr. | Raleigh |
| *Royster. H. A., | " |
| Sackett, W. G., Baptist Female University, | " |
| Shermau, Franklin, Jr., Dept. Agr., | " |
| Smith, Henry L., Davidson College, | Davidson. |

* Moved to another State.

## APPROACHING SUNSPOT MAXIMUM.

J. F. LANNEAU.

The condition of the sun's surface as to spots—when most pronounced, most persistent—is clearly a matter of judgment, and therefore must lack precision as to date.

The last maximum occurred in or near the year 1893. Thereafter, for six or seven years the spots diminished in size and number. During the past three years it has been a very rare occurrence to see on the sun even a small spot. But beginning last July, there is now a decided renewal of solar disturbance.

My observations at Wake Forest are made with a five inch equatorial. It has a clock work motor, and also two adjusting rods at the eye end for movements in declination and right ascension.

A polarizing eye-piece is so used as to show the sun's disk reversed east and west, but normal north and south.

In default of a micrometer attachment for exact determination of size and location of spots, approximate measurements are made by stopping the clock work, and then noting intervals between transit of spot and transits of sun's east and west limb. Obviously, the distances are proportional to the intervals of time.

Measurements are also made without stopping the clockwork, by using each adjusting rod as a micrometer screw. To so use them, I first find by careful repetition the number of turns or partial turns of the declination rod to move the horizontal wire of the eye-piece north and south the full breadth of the sun's disk; and in like manner, the number of turns of the other rod to move the vertical wire east and west across the disk.

Then, using the rods in turn, relative distances at right angles are found. Points are thus located, and lengths determined.

Observations of the sun during July and for the past thirty days supply the material for this paper.

At noon of July 1st there was a single small spot on the sun's disk. On the 9th there were 53—forming three groups. Their relative positions, and that of others observed during the month, are shown in the sixteen drawings which illustrated "Sunspots in July," published in Popular Astronomy for August.

By the courtesy of the publishers the drawings are here reproduced; also a part of the matter of this paper. Fig. 1 represents the sun's disk at noon July 9th. Group 1, on the left, is simply indicated by three spots—the largest of its 21 spots. Group 2, of 17 spots, and group 3, on the right, of 15 spots, are indicated each by its two chief spots.

By the next noon a half dozen spots had disappeared, or had emerged with others. At noon July 11th several spots in group 3 were much enlarged, as shown in the drawing for that day. But of the 53 spots in view two days before, only 34 remained.

By July 14th group 1 had passed out of view beyond the sun's western edge; and of groups 2 and 3 there remained only 4 spots. By the next noon, July 15, all had passed beyond view except a single spot north of the equator. But a new group of 8 spots had appeared on the disk's south-east quarter (Fig. 5.)

This group, it is interesting to note, had evidently formed since noon of the previous day—for then that part of the sun's disk was without blemish.

So too, before the next noon another new group formed in the north-east quarter—group 5, shown in drawing for the 16th. And again, on the 24th, there appeared a newly formed group of 11 spots. It was still conspicuous on the 29th, the last day of my July observations.

Within that month as many as 90 spots marred the solar surface—part of them north of the sun's equator and part south, in two fairly well defined belts or zones as shown in the drawings.

N

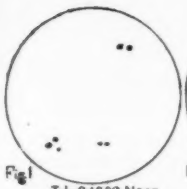

Fig 1 July 9, 1903 Noon

Seven large spots.

Group 1 in S.W qr. 21 spots
" 2 S.E 17 "
" 3 N.E 15 "
(Small spots not shown.)

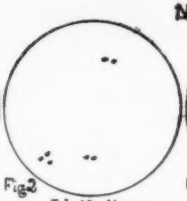

Fig 2 July 10 Noon

Large spots little changed.

In group 1 only 11 spots seen
" " 3 15 " "

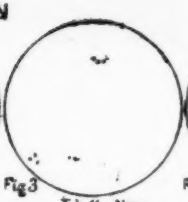

Fig 3 July 11 Noon

More large spots

In group 1 only 5 spots seen.
" " 3 15 " "

Fig 4 July 14 Noon

Only four large spots

Group 1 gone - passed w. limb
" 2 only one spot seen
" 3 three spots

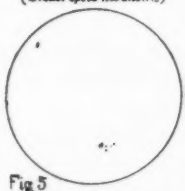

Fig 5 July 15 Noon

Group 1 gone - passed w. limb
" 2 "
" 3 only one spot seen
" 4 a new group of at least eight spots in S.E qr

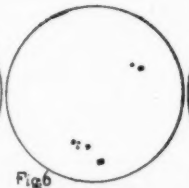

Fig 6 July 16 Noon

Group 3 one spot quite narrow
" 4 only five spots seen
" 5 a new group of two spots in the N.E quarter

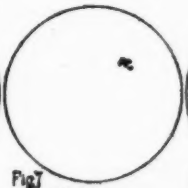

Fig 7 July 17 Noon

Cloud-veils hinder seeing

Only group 5 visible - and shows three additional spots

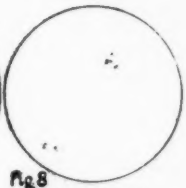

Fig 8 July 18 Noon

Group 4 much changed

Group 5 shows a new spot to the north

W E

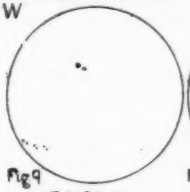

Fig 9 July 20 Noon

Group 4 six small spots
" 5 only two

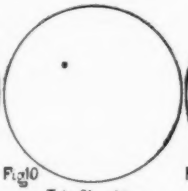

Fig 10 July 21 Noon

Group 4 not visible
" 5 only one spot

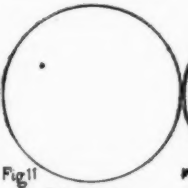

Fig 11 July 23 Noon

Group 5 shows a single spot

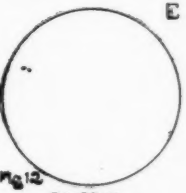

Fig 12 July 25 Noon

Group 5 shows two distinct spots

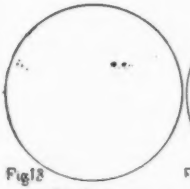

Fig 13 July 24 Noon

Group 5 shows five spots
" 6 is a new group of two large and at least nine small spots - formed since the preceding noon

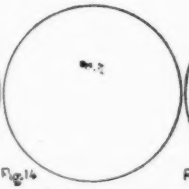

Fig 14 July 25 Noon

Only group 6 shown - one large spot with double nucleus, seven medium spots, and seven small ones

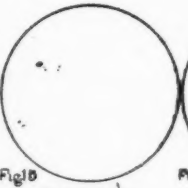

Fig 15 July 27 Noon

Group 6 shows fewer spots
" 7 is a new group of two spots in the S.W quarter, but nearer the equator than were groups 1, 2 & 3

Fig 16 July 29 Noon

Only group 6 in view - much changed

S

No such persistence and rapid succession of spots and groups has occurred in the past five or six years. They were certainly heralds of an approaching sunspot maximum.

These numerous July sunspots were indeed all relatively quite small. And size as well as number is an element in such a maximum. This element of size, however, has already begun to appear.

In October a very large group of spots darkened the sun's disk. By using a shield of smoked glass, it could be seen with the naked eye. My first observation of it was made at noon on the 14th. It was then larger than any group seen since the 13th of February, 1892.

By October 18th it reached the sun's western limb and passed out of view. But in due time—at its earth-rise—it reappeared to us on the sun's eastern edge. It was there in full view when I looked in the morning of October 30th.

It had greatly altered in form. Earlier in the month it was somewhat rectangular in shape. Its vast area excited general interest. As estimated by good authorities it was 120,000 miles long and 40,000 miles broad. That is, it covered an area more than 24 times the entire surface of our earth.

When again seen at Wake Forest, October 30th, just after its reappearance, it had divided into three great spots. Four days later, when well advanced into view, it was more changed—one spot had almost closed; each of the other two had expanded and about them were grouped 18 relatively small spots. With like mutations it remained a conspicuous object until yesterday, November 12th, when it again passed the sun's western edge out of view.

Meanwhile, two other extensive groups appeared. The first of these was observed October 26th, just as it rounded the sun's eastern edge.

It was triangular in shape and about one third the size of the great group which has now twice passed the western edge. My notes record its varied aspects from day to day until it too passed the sun's western edge on the 7th of November.

The other group—the third in order of these extensive disturbances—was seen near the east limb Nov. 4th. Next day, when more fully in view, it showed four very large spots with 15 smaller ones clustered about them. Its area exceeded that of its immediate predecessor and its changes in form were more surprising.

These three great groups, in view during the past thirty days, had a total area more than 40 times the surface of our earth.

They amply furnish the element of size, as the July sunspots gave that of number,

Number and size of spots indicate growing solar disturbance, and evidence unmistakably an approaching sunspot maximum

The period from one maximum to the next being about 11 years, we may expect the one now approaching to culminate in or near the year 1904—next year.

It is not intended in this brief paper to discuss the many-sided subject of sunspots; still less to even question profundities of the sun's constitution, or to consider the sources of its seemingly exhaustless energy.

I add, however, a single suggestion as to the nature of sunspots.

They are often referred to as furious solar storms or cyclones. Unquestionably, in spot areas the surface material is tossed and torn asunder and adjacent glistening faculæ consist of solar matter thrown into wildly irregular ranges piled many times mountain high.

But *can* there be at the sun's fiercely hot surface any such *difference* of temperature as is essential to movements in anywise analogous to storms terestrial?

Moreover we note on the sun a fairly sharp boundary between the dark disturbed areas and the adjoining bright regions; while here, on the earth, there is a gradual transition from regions of storm to regions of calm.

Again, storms sweep the earth's surface; but visible mo-

tion, in sunspots, or appearance of motion is mainly vertical.

In either view allowing remoteness of resemblance, may we not liken sunspots to our earthquakes rather than to our wind storms?

Is it objected that a sunspot covers a great area, and often persists for weeks or months?

True our earthquakes usually produce *visible* results only in small areas, and quickly subside; but often they are *felt* throughout an extensive territory.

The earthquake of last week, Nov. 4th, which caused consternation in the city of St. Louis, was felt in eight states—Missouri, Illinois, Indiana, Kentucky, Tennessee, Mississippi, Louisiana and Arkansas.

In the year 357 A. D. an earthquake in that ill-fated region which we now know as politically convulsed Macedonia, was so wide spread that it swallowed up 150 cities.

The great earthquake of 1755 which destroyed Lisbon with its 50,000 people, destroyed or damaged several other cities in Portugal and some in Spain and in Morocco and extended its disasters east to Arabia and west to the island of Madeira.

In 394 A. D. an earthquake in Europe wrought its destruction of city after city for fully one month; and one in Constantinople in the year 480 A. D. convulsed that region for forty days.

In point of fact, then, as regards both extent and duration there *is* analogy between the sunspots and the earthquake.

From these several considerations—somewhat uniform surface temperature, sharp demarcation, preponderance of vertical motion, and analogy in extent and duration—we may say the spots are in no sense solar surface storms, but rather deep seated *sunquakes*.

As shown, the first great sunquake in October was of vast extent, and displayed its vigor for more than a month.

The sunspot maximum at hand—*sunquake* maximum—promises abundant opportunity for noting other such outbursts of solar energy—some perhaps on a still grander scale.

# THE BOX TORTOISES OF SOUTHEASTERN NORTH AMERICA.

C. S. BRIMLEY.

The Box Tortoises (genus Terrapene Merrem 1820=Cistudo Auctorum) comprise a group of six closely related forms, of which one is known only from Mexico, while the other five are found in the United States.

The described forms are:

1. Terrapene carolina (L), 1758.
2. Terrapene triungis (Ag), 1857.
3. Terrapene mexicana (Gray), 1849.
4. Terrapene ornata (Ag), 1857.
5. Terrapene major (Ag), 1857.
6. Terrapene bauri (Taylor), 1895.

The* characters of these species as given by W. E. Taylor are as follows:

I. Three digits on the hind foot.

1. Zygomatic arch complete. Webs absent. Phalanges on the fore foot, 2, 3, 3, 3, 2; hind foot, 2, 3, 3, 2, 1. *Bauri.*

2. Zygomatic arch incomplete. Webs absent. (a) Number of phalanges in the fore foot, 2, 3, 3, 2, 2; hind foot, 2, 3, 3, 2, 1. Carapace tectiform *Mexicana.* (b) Number of phalanges in the fore foot, 2, 3, 3, 2, 2; hind foot, 2, 3, 3, 2, 1. Carapace not tectiform *Triungis.*

II. Four digits on the hind foot.

1. Zygomatic arch complete. Webs distinct. Phalanges in the fore foot, 2, 3, 2, 3, 2; hind foot, 2, 3, 3, 3, 1. *Major.*

2. Zygomatic arch rudimentary. Digits slightly webbed. Phalanges in the fore foot, 2, 3, 3, 3, 2; hind foot, 2, 3, 3, 3, 2. Carapace keeled. *Carolina.*

3. Zygomatic arch absent. Phalanges in the fore foot,

*The Box Tortoises of North America by W. E. Taylor, Proc. U. S. N. M., Vol. XVII., pp. 573–588. 1895.

2, 2, 2, 2, 2; hind foot, 2, 3, 3, 3, 1. Carapace not keeled. *Ornata.*

The same year *Cope, relying on the same characters, divided Terrapene into four genera, viz.:

1. *Terrapene* Merrem, with four digits in the hind foot and zygomatic arch incomplete (T. carolina and T. ornata).

2. *Onychotrea* Gray. Three digits in the hind foot and zygomatic arch incomplete (T. mexicana and T. triungis).

3. *Pariemys* Cope. Three digits in the hind foot, zygomatic arch incomplete (T. bauri).

4. *Toxaspis* Cope. Four digits in the hind foot, zygomatic arch complete (T. major).

Both Cope and Taylor use the word "digit" in these tables in a misleading manner. What is really meant is "claw" or "clawed digit"; all the species of Terrrpene having at least four digits from an osteological point of view, the fourth digit not being distinguishable in the flesh except when terminating in a claw. Taylor's diagnosis of the species would be satisfactory enough were it not for the fact that some of the characters relied upon are subject to variation in the same species.

Having been considerably puzzled by this individual variation in my endeavor to satisfactorily identify specimens of these forms, I have taken pains during the past two or three years to examine specimens of the various forms which have passed through my hands in order to ascertain so far as possible with the material at my disposal their relation to one another.

So far I have come to the conclusion that of the five forms inhabiting the United States, three are undoubtedly good species, viz., *carolina*, *major* and *ornata*. With regard to the othertwo *bauri* may be identical with *major*, or it may be the Florida local race of that species, or it may be extinct; I cannot tell which. Western *triungis* I believe to be at least a

*Taylor on Box Tortoises, by E. D. Cope, Am. Naturalist, 1895, August: pp. 756–7.

well marked race of *carolina* and not unlikely a distinct species. *Triunguis* from Georgia may be intergrades between typical *triunguis* and *carolina*, or they may be possibly in part hybrids with *bauri*. I will now discuss the specimens I have examined in detail.

*Terrapene carolina*. Specimens from Raleigh show the following characteristics: carapace marked with large yellow spots, these often forming to some extent partially concentric figures; keel of the carapace always present, but not marked by a continuous yellow line. Plastron usually black in adults, often showing light spaces, apparently due to abrasion; in younger specimens it is usually yellow more or less marked with dusky, head usually with yellow spots. Hind feet usually larger and stronger than in *triungis*, usually with four claws, but I have seen three specimens with three-clawed hind feet from this locality. Zygomatic arch incomplete, but the quadratojugal very variable in size and shape; in five specimens examined Feb. 11, 1903, two had the quadratojugal long nearly extending to the jugal, nearly completing the arch; in two it was small and triangular, and in the fifth absent altogther.

The newly hatched young of this species have the carapace broad with the keel marked by a row of yellow spots, the head is without yellow markings in the very young, though usually marked with yellow spots in the adult.

*Terrapene triungis*. Five specimen of *triungis* fromColmesneil in Eastern Texas show the following characteristics: the carapace is shorter and rounder than in any other species examined, the ground color is light brown in all, but the markings show an interesting variation—a living specimen received Oct. 22, 1902, had the carapace marked with a few radiating black lines only, no yellow spots; a shell of one of the others shows very numerous rather faint yellow spots arranged in radiating lines, the upper edges of the lateral plates with some black markings and a few black spots interspersed with the yellow spots; a third specimen has very

numerous distinct yellow spots arranged in radiating lines; a fourth has a little black only, with faint indications of yellow spots; a fifth is practically unmarked. All these five have the plastron light brown unmarked and three claws on the hind feet; the edge of the hind foot beyond the third claw is straight in all five without a notch showing the termination of the fourth digit. Feet unwebbed in all five. One of the five has only traces of a keel.

These were examined with regard to the quadratojugal. In one of these it was absent; in the other two, small and triangular.

*Terrapene triungis* (?) from Georgia. These are a very variable lot and I am doubtful whether they are the same species as those from Colmesneil, Texas. These Georgia specimens appear to me to be probably a three-clawed form of *T. carolina* but present some differences.

In twenty living specimens examined in May and June, 1903, five had the hind feet four-clawed and fifteen had them three-clawed. Nearly all the latter had a notch on the hind foot showing the termination of the fourth digit. This notch was absent in one specimen and only slightly indicated in several others. The markings on plastron and carapace are quite variable. The former is usually more or less variegated, the markings frequently assuming the regular pattern which is characteristic of *T. carolina*. Often, however, they are irregular and the plastron is frequently all yellow, but in one specimen only have I seen it all dark.

The carapace is dark brown usually marked with roundish yellow spots which vary greatly in size, but are never as small or numerous as in the Colmesneil specimens. These spots sometimes largely coalesce forming irregular yellow markings which may occupy the greater port of the shell to the exclusion of the ground color.

The head is usually marked with large round yellow spots, sometimes, however, these are small or mainly absent and sometimes the head markings are similar to those of T. *bauri*.

The specimens I have seen average smaller than Raleigh specimens of T. *carolina* and the carapace is usually smoother and less flaring behind.

The zygomatic arch is incomplete in all specimens examined, but the quadratojugal is variable, in six specimens examined it is absent in three, small and triangular in one and in two others long and slender nearly completing the zygomatic arch; one of these last two has the head and shell markings nearly as in *bauri*, the other is an average *triungis*.

Hind feet narrower than in *carolina* usually not at all webbed. A small specimen from Hancock Co., Miss., has the hind feet unwebbed with three claws and notch; quadratojugal small triangular; markings much as in the average of Georgia specimens.

Two specimens just hatched, from Mimsville, Ga., are indistinguishable from *carolina* of the same age from Raleigh.

*Terrapene bauri.* This species was originally described in 1895 by Taylor from a single three-clawed specimen with zygmatic arch present and may be identical with *major* or a local race of that species, however, as Florida specimens seem tolerably constant in characters and as the few specimens of undoubted *major* that I have seen, do not agree exactly with them, I think it best to treat it provisionally as distinct. Nearly all Florida specimens I have seen have constant head markings. These are a yellow line from lower edge of orbit crossing the corner of the mouth, a yellow line from posterior corner of orbit backward down neck, a yellow line commencing just behind nostril and proceeding just above orbits, ending just behind orbits, a yellow line down neck in line with foregoing.

The carapace is usually darker brown than in the other species, marked with narrow yellow radiating lines; sometimes these lines are broken into spots and sometimes the spots are irregular and not in rows. This latter variation seems to be due in some specimens to the animal having been "burnt over" and the shell scarred, in which case the pattern

on the renewed dermal plates seems to be always irregular. Keel always present, marked by a continuous yellow stripe. Plastron usually yellow, unmarked, sometimes variegated with brown. Hind feet usually slightly webbed but the amount of webbing very variable, some specimens with feet unwebbed, others with the webs comparatively well developed.

Hind claws three or four; of the earlier specimens received from Florida nearly all were three-clawed, in those received lately four-clawed hind feet seem to be more usual. Of four typically marked *bauri* received November 12, 1903 from Orlando, Fla., one has the hind claws four on both feet, two have them three on both feet, and one has four on one foot and three on the other, zygomatic arch complete in every specimen I have ever examined from Florida. Dr. Lonnberg* however states that the skull of a specimen from Orange Co., Fla., in his possession, had no zygomatic arch, not even the slightest rudiment of a quadrato jugal being present.

The carapace of T. *bauri*, I might add is narrower in proportion than that of the other forms and has a less tendency to flare outward behind.

Young T. *bauri* just hatched show the characteristic head markings, narrower carapace, and yellow stripe down the keel of the adult.

*Terrapene major*, Two specimens from Tallahassee in continental Florida are the largest Terrapene I have ever had, measuring 170 and 180 mm in lengh of shell. The shell is not as narrow and flares outwardly more behind than in *bauri*, the carapace is dark brown with yellow spots arranged radially and a yellow stripe down the keel. Head with yellow markings, but not as in *bauri*. Plastron yellow with more or less black round the edges of the plates. Zygomatic arch complete, broad. Hind feet more strongly webbed than in any other Terrapene I have had, the webs more extensive in the smaller specimen. Hind feet with four claws. A

* Is the Florida Box Tortoise a distinct species by Einar Loennberg. Proc U. S. N. M. XIX No. 1107.

specimen from Riceboro, Ga., also apparently belongs here, length 140 mm, shell dark brown with narrow radiating yellow stripes; yellow on the keel not forming a continuous stripe, Plastron dark brown with light variegations. Head with round yellow spots, no stripes, zygomatic arch complete, claws on the hind feet three, and a notch showing termination of fourth digit, hind feet somewhat webbed, shape of the shell much as in the two Tallahassee specimens, perhaps a little shorter in proportion, flaring outwardly behind.

*Terrapene ornata.* This has the shell flatter and broader than the other forms, always without a keel. Color light brown with narrow radiating yellow lines on the carapace plastron brown, marked with yellowish lines arranged in regular pattern, posterior to the hinge they are mainly longitudinal while anterior to it they show a tendency to become transverse, zygomatic arch always incomplete. Hind claws always four. Hind feet always unwebbed. Some specimens, apparently males, have the first claw on each hind foot turned forward, while others, apparently females have it normal in position.

I may mention apropos of nothing that male tortoise have longer and thicker tails than the females, this feature is strongly marked in the genus Kinosternon, for instance and less strongly so in all Emydoid turtles I have examined.

*Terrapene mexicana.* This species I have not seen, its range is apparently confined to Mexico.

The range of the different forms of Tarrapene is roughly as follows:

*Terrapene carolina.* North-eastern U. S. east of the Mississippi, south to the Carolinas.

*Terrapene triungis.* Gulf coast and Mississippi valley from Georgia to the Rio Grande, North to Missouri.

*Terrapene bauri.* Florida and southern Georgia.

*Terrapene major.* Gulf coast, Georgia to the Rio Grande.

*Terrapene ornata.* Rocky mountains to Lake Michigan and Indiana, south to Chihuahua; in the southern part of its range it does not come east of Texas.

## Specimens Examined.

*Terrapene carolina.* Eight alcoholic and numerous living specimens from Raleigh, N. C.

*Terrapene triungis.* 33 living and 7 alcoholic specimens from Baker Co., Ga.; five living (three of them afterwards preserved) specimens from Colmesneil, Texas, one alcoholic from Hancock Co., Miss.

*Terrapene bauri.* Four living speeimens from Orange Co., Fla., (three of them afterwards preserved), seven alcoholics from Hastings, Fla.; one alcoholic from Orlando, Fla., and one from Baker Co., Ga.

*Terrapene major.* Two from Tallahassee, Fla.; one from Riceboro, Ga.

*Terrapene ornata.* Several each from Waco, Texas, Austin, Texas, and Northern Chihuahua, Mexico.

## CHAPEL HILL LIVERWORTS.

W. C. COKER.

North Carolina liverworts were not been neglected by the older generation of Botanists who brought so much credit to our Southern States in the early and middle parts of the last century. That excellent old Botanist, L. de Schweinitz, of Salem, not only did brilliant poineering work in the Fungi, but also found time to publish a valuable work on Hepaticeae of America (1826), many of the specimens described coming from this State. W. S. Sullivant, of Ohio, also described a number of North Carolina Hepaticeae in his publication of 1845. Dr. M. A. Curtis, of Hillsboro, N. C., in his catalogue of North Carolina plants* gives sixty-nine species of liverworts, twenty-three of which have so far been found at Chapel Hill. The remaining nine species in the following list are not given by Curtis.† This work of Curtis' is, so far as I know, the only list of North Carolina Hepaticeae. In 1899 Dr. D. S. Johnson collected a few Hepaticeae from around Beaufort, N. C., among them the interesting tropical form, Cololejeunea Jooriana, which has not been found further north.

In the steady of our list of Chapel Hill Hepaticeae, I have been greatly aided by Dr. Alexander W. Evans, of Yale University, who kindly identified a number of forms, confirmed my identification of others, and given informtion as to distribution. Species identified by Dr. Evans are so designated. The list follows.

Frullania virginica, Lehm. On trees and rocks. Common, often with rotifers in the saccate under lobes.

* Geological and Natural History Survey of North Carolina. Part III. Raleigh, N. C. 1867.

† There is a fault in the printing in my copy of this quite rare pamphlet, by which several species are omitted. It is possible, therefore, that some of the species mentioned as not given by him were really in his list.

Archelejeunia clypeata, (Schwein) Schiffner. On rocks near streams.

Cololejeunia Biddlecormia (Aust) Evans. Bases of trees in very damp places. Vegetative parts in the center of the circular growth forms numerous gemmae and disappears as the outer part increases in circumference, in this respect resembling Lichens, which form soredia most abundantly in the central dying region. Not found by Curtis. (Identified by Evans.)

Radula obconica, Suliv. Given by Underwood in Gray's manual as extending from New Jersey to Ohio. Not found by Curtis. (Identified by Evans.)

Porella pinnata, L. On rocks close to where the spray reaches, or often immersed. Not found by Curtis.

Porrella platyphylla, Lindb. On trees and in woods, common. Vegetative branches closely oppressed, fruiting branches becoming erect and so lifting the capsules from the substratum. Not found by Curtis. (Identified by Evans.)

Trichocolea tomentella, Dumort. On ground along streams. Very rarely forming fruit.

Bazzania deflexa, Underw. Not found by Curtis.

Cephalozia multiflora, Spruce. Not found by Curtis.

Kantia trichomanis, S. F. Gray. On ground by streams. The tips of some of the branches bend upward and bear numerous gemmae on their tips. (Confirmed by Evans.)

Scapania nemerosa, Dumort. Common on ground in damp places. Here the ordinary leafy branches turn up slightly at the ends and bear dark masses of gemmae. Evans says of our Chapel Hill specimens, "Probably S. nemerosa although not quite typical."

Lophocolea heterophylla, Nees. (Identified by Evans.)

Diplophyllum albicans. Dumort. Var. taxifolium, Nees. On rotten wood. Not found by Curtis.

Chilocyphus ascendens, Hook and Wills (?).

Chilocyphus polyanthos, Corda (?). Evans says in reference to these two last species, "The two species of Chilocy-

phus I am in considerable doubt about. Number five is probably C. chilocyphus and number nine C. ascendens, but the leaves are more sharply lobed than I have ever seen before."

Plagiochila asplenoides, Dumort. On ground by brooks. Not common. (Confirmed by Evans).

Liochlaena lanceolata, Nees. Not found by Curtis.

Fossombronia salina, Lindb. Identified by Evans who says, "It seems to be preferable to F. salina Lindb. This species has a range extending from Connecticut along the coast to Florida and is apparently found in the West Indies also."

Pallavicinia Lyelli, S. F. Gray. Not common. (Confirmed by Evans).

Pellia epiphylla, Raddi. Common by streams.

Metzgeria conjugata, Lindb. Curtis gives M. furcata and M. conjugata for North Carolina. Gemmae are produced in abundance on marginal cells.

Anuera multifida, Dumort. In very damp places. I have found this on the floor of a mill race in South Carolina covered by several inches of swiftly flowing water. (Confirmed by Evans).

Aneura pinguis, Dumort. Forming large mats in springy places. (Confirmed by Evans).

Anthoceros laevis, L. Common.

Notothylas orbicularis, Sulliv. Not common in this region.

Marchantia polymorpha, L. Very rare here. Found in only one spot by Mr. H. A. Allard.

Fimbriara tenella, Nees. Not rare in low meadows.

Conocephalus conicus, Dumort. Plentiful, but rarely fruiting. The gametophyte contains abundant michoriza.

Asterella hemisphaerica, Beauv. Bases of stone walls on North side, and in damp old fields.

Dumortiera hirsuta, Nees. With or without air chambers, depending on location.

Riccia sp. Probably R. flutans. On damp open ground.

Sphaerocarpus terrestris, Smith. Edges of cultivated fields. The spores remain united in tetrads. Male plants minute, purplish.

## RECENTLY DISCOVERED MINERAL LOCALITIES IN NORTH CAROLINA.

COLLIER COBB.

I have found the following minerals heretofore unknown in North Carolina:

*Prase*, green quartz, with included crystals of black tourmaline, one mile south of Franklin, Macon County.

*Hausmannite* and *Braunite*, Liberty, Randolph County, and Siler City, Chatham County.

*Braunite*, Hiltop, Surry County.

Reported at 138th meeting of the Elisha Mitchell Scientific Society, January 21st, 1902.